Journal of the Society of Arts.

FRIDAY, MAY 3, 1861.

INTERNATIONAL EXHIBITION OF 1862.—GUARANTEE DEED.

The Council beg to announce that the Guarantee Deed is now lying at the Society's House for signature, and they will be much obliged if those gentlemen who have given in their names as Guarantors, as well as others who take an interest in the Exhibition, will make it convenient to call there and attach their signatures to the Document. Signatures for sums amounting in the aggregate to £393,000, have already been attached to the Deed.

GUARANTEE FUND FOR THE EXHIBITION OF 1862.

The following additions have been made since the last announcement, in the *Journal* for April 26 :—

*** *The names marked with an asterisk are those of Members of the Society of Arts.*

NAME.	AMOUNT.	REPRESENTING THE OBJECTS OF THE SOCIETY—ARTS, MANUFACTURES, AND COMMERCE.
Charles Finch Foster, Mayor of Cambridge	£1,000	Arts.
William Mc Cormick, M.P., 10, Cambridge-terrace, Regent's-park, N.W. ...	2,000	Arts.
*Elkanah Healey, Oakfield, Gate-acre, near Liverpool	100	Commerce.
Boord, Son, and Beckwith, Bartholomew-close, E.C.	500	Commerce.
George Wright and Co., Burton Weir, Sheffield	500	Commerce.
*Joseph Underwood, 5, Hyde-park-gardens, W.	1,000	Commerce.
James Ferrabee and Co., Phœnix Iron Works, near Stroud	100	Manufactures.
Puer and Hall, Hyde Foundry, Bury	1,000	Manufactures.
W. S. Shove, Lee-terrace, Lee, S.E.	500	Arts.
J. R. Losada, 105, Regent-street, W.	200	Commerce.
F. Robinson, 7, Parliament-street, S.W.	300	Arts.
Edward Cottam, 7, Parliament-street, S.W.	300	Commerce.
*Charles Nightingale, 64, Wardour-street, W.	250	Commerce.
J. M. Johnson, 3, Castle-street, Holborn, E.C.	100	Commerce.
*Pliny Miles, 169, King's-road, Chelsea, S.W.	200	Commerce.
Henry Solomon, Houndsditch, E.C.	250	Commerce.
Cottam and Co., 2, Winsley-street, W.	300	Commerce.
Robert Pike, St. Aldate-street, Oxford	100	Arts.
James Hughes, 9, Crescent, Oxford	100	Arts.
The Oxon Wine Co., Oxford	100	Commerce.
Standen and Co., 5, Park-street, Oxford	100	Arts.
Henry Hatch, Park Town, Oxford	100	Arts.
Josepn Round, 33, Beaumont-street, Oxford	100	Arts.
*James M. Venning, 7, Petersham-terrace, Queen's-gate, W.	100	Arts.

By Order,

P. LE NEVE FOSTER, *Secretary.*

ARRANGEMENT OF MINERALS AND MINERAL MANUFACTURES IN THE EXHIBITION OF 1862.

The following is the reply of Her Majesty's Commissioners to the Memorial from owners of mineral property, producers of minerals, mineral manufacturers, and others, published in the *Journal* for the 19th ult., page 398 :—

Offices, 454, West Strand, London, W.C.,
April 24th, 1861.

Sir,—Her Majesty's Commissioners for the Exhibition of 1862, direct me to acknowledge the receipt of your letter of the 15th instant, and of the memorial sent therewith.

I am to inform you in reply that the Commissioners are glad to observe the interest which the memorialists, representing various mineral productions of South Wales, take in the arrangement of the Exhibition.

But before any plan for the actual arrangement of objects in the Exhibition building can be determined on, it is indispensable that the Commissioners should be informed, by foreign countries and British colonial exhibitors, what are the precise classes of objects to be exhibited, and what space they are likely to occupy. The experience of the Exhibition of 1851, and of the Paris Exhibition of 1855, shows that there are great difficulties in obtaining such information from foreign countries and exhibitors in the Colonies until a very late period. Moreover any plan of arrangement must not only be possible of accomplishment within a short period, but must be one which the exhibitors would be willing and able to execute on their own behalf.

The Exhibition throughout is a voluntary and self-supporting work, and it is essential to success that nothing should be attempted which is not likely to receive the heartiest co-operation of the exhibitors.

The Commissioners do not apprehend that any official rules will prevent the memorialists from giving effect to their own wishes of exhibiting specimens of like minerals together for the purposes of comparison, and of accompanying them with illustrative manufactures, models, diagrams, &c. Such a work must, however, be done by exhibitors themselves. The Commissioners will be glad to hear that the proprietors and workers of copper mines, for example, have entered upon some united course of action for exhibiting samples of copper from all parts of the United Kingdom in a systematic series, and of inducing coppersmiths and other manufacturers of articles produced from copper to exhibit their manufactures in juxta-position, and in illustration of the employment of the raw material.

Should it not be practicable to induce manufacturers thus to give up their manufactures for the purpose, another course would be for the mineral producers to furnish the manufacturers of copper goods with samples of the raw materials, and to induce them to place the samples with the manufactures. It will be obvious, however, that as the manufacturers in copper may be more numerous than the producers of the raw material, it would not be necessary that each manufacturer should exhibit raw materials obtained from similar sources. All such mutual arrangements, however, must be voluntary, and must be organized independently of the direct action of the Commissioners, who, whilst they will be happy to afford any assistance in their power, cannot enter on the cost or responsibility of making them.

In the Paris Exhibition the productions of the larger exhibiting nations were separated in four or more places in the buildings. For example, the machinery of all countries (with some exceptions, however) was brought together; so were the chemical manufactures, minerals, &c. The Commissioners hope they will be able to adopt and even extend the same principle in the Exhibition of 1862, without impairing the highly interesting features which arise from national groups. How far it may be possible to carry out this principle must be determined after the wishes and intentions of the foreign countries and the British Colonies are known, and the early information they may afford to the Commissioners.

The Commissioners are preparing a list of the different producers and manufacturers in the United Kingdom, who will be arranged according to the classes of the Exhibition which have been already published, and as soon as this list is ready copies shall be sent to the memorialists.

I am, sir,
Your obedient Servant,
F. R. SANDFORD, Secretary.

Alexander Williams, Esq., &c., &c., &c., Neath.

CONVERSAZIONI.

The Council have arranged for two Conversazioni during the present Session; the first to-morrow, Saturday, the 4th of May, at the Society's House, the card for which will admit the Member only; the second on Saturday, the 1st June, at the South Kensington Museum, the card for which will admit the Member and two ladies, or one gentleman.

Cards for both these Conversazioni have been issued. Any member not having received them should communicate with the Secretary.

Secretaries of Institutions in Union, who may receive applications from any of their members desirous to attend either of these Conversazioni, can have a limited number of cards placed at their disposal on application to the Secretary of the Society of Arts.

EXHIBITION OF PICTURES BY THE LATE JOHN CROSS.

The promoters of the subscription fund for the purchase of one or more of the unsold works of the late John Cross, the author of the picture, "The Clemency of Cœur de Lion," in the New Palace of Westminster, have accepted the permission of the Council of the Society of Arts to exhibit, in the Society's Great Room, the works and sketches of that lamented artist, where they may be seen during the present month.

The subscription (which now approaches one thousand pounds) will be appropriated to the purchase of one or more of the three great works unsold now exhibited in the Society's rooms, for presentation to some public Institution or Institutions, as a tribute of memory to the artist, and as a means of rendering assistance to his widow and children, otherwise unprovided for.

Subscriptions will be received, during the exhibition of the pictures, by the Secretary of the Society of Arts; or by E. B. Stephens, Esq., Hon. Sec. to the Fund Committee, 27, Upper Belgrave-place, Pimlico, S.W.

The following are the pictures that have been collected for exhibition:—

1. Murder of Thomas à-Becket, Archbishop of Canterbury, Dec. 29th, 1170–71. Painted in 1852.
2. Small repetition of the same (unfinished).
3. Lucy Preston's Petition, A.D. 1690. Small copy (unfinished).

"Lucy did not reply; she only raised her eyes, with an appealing look to the Queen, and then turned them expressively on the portrait of King James, opposite which her Majesty was standing."

4. Original Sketch for the same.
5. Photograph from the original Picture, painted, 1856.
6. Chalk Studies for "the Clemency of Cœur-de-Lion." (No. 16.) Westminster Prize Picture, 1847.
7. Last Sketch by the Artist in Charcoal, an intended Picture for the Exhibition of 1862. Incident in the life of Wickliffe, A.D. 1379.
8. Sketch from Mr. Cross' residence, Montmartre, Paris.
9. Photograph-portrait of the late John Cross.
10. Sketch for the Picture, "Edward the Confessor leaving his Crown to Harold." Painted for Sir S. Morton Peto, Bart., M.P., 1851.

"On the other side it is maintained, with equal confidence, that he named Harold his successor, and told the chiefs and churchmen that no one was so worthy of the crown as the great son of Godwin."—*Knight's History of England.*

11. Sketch for the Picture—Harold's Oath to William. Painted for Sir S. Morton Peto, Bart., M.P., 1851.

"Harold, who it is said was thus publicly taken by surprise, durst not retract; he stepped forward, with a troubled and confused air, laid his hand upon the book, and swore. As soon as the oath was taken, at a signal from the Duke, the missal was removed, the cloth of gold was taken off, and the large tub was discovered filled to the very brim with dead men's bones, and dried-up bodies of saints, over which the son of Godwin had sworn without knowing it. According to the Norman chroniclers, Harold shuddered at the sight."—*Knight's History of England.*

12. Proof print of the Clemency of Cœur-de-Lion. (No. 16.) Engraved by Shenton, after Cross.
13. First idea for this picture. (No. 16.)
14. Chain Armour, made by the Artist for his great picture. (No. 16.)
15. Original Sketch for the Burial of the Princes in the Tower.

16. Death of Richard Cœur-de-Lion, A.D. 1199.* This picture, exhibited in Westminster Hall, 1847, was awarded a prize, and purchased by the Royal Commissioners of Fine Arts. It is now the property of the nation, and was lent for this Exhibition by the Right Honourable the Chief Commissioner of Public Works.

17. Burial of the Princes (sons of Edward IV.) in the Tower, 1485. Painted, 1850.

18. Coronation of William the Conqueror. Painted, 1858.

"On the Conqueror being proclaimed King, the loud shouts of the English and French were mistaken for hostile tumult, and the Normans, thinking the whole population of London had risen against them, fired the near English houses, &c. Meanwhile, William, though trembling from head to foot, and left almost alone in the church, or with none with him save the Archbishop Aldrid and a few pale panic stricken priests, all clustering around the altar, most resolutely refused to postpone the celebration, and held the crown of England in his grip, as though no mortal man should ever wrest it from him."—*Knight's History of England.*

19. First Sketch for the above Picture.

20. Photograph from the above Picture.

THIRTEENTH ANNUAL EXHIBITION OF INVENTIONS.

The Exhibition was opened on Monday, the 1st of April, will remain open every day until further notice from 10 a.m. to 4 p.m., and is free to members and their friends. Members by ticket, or by written order, having their signature, may admit any number of persons. Members of Institutions in Union with the Society are admitted on showing their cards of membership.

TWENTIETH ORDINARY MEETING.

WEDNESDAY, MAY 1, 1861.

The Twentieth Ordinary Meeting of the One Hundred and Seventh Session was held on Wednesday, the 1st inst., Peter Graham. Esq., Member of the Council, in the chair.

The following gentlemen were proposed for election as members of the Society:—

Arundel, John	Clapham-park, S.; and 1, Gutter-lane, Cheapside, E.C.
Crawfurd, John, F.R.S.	21, Wilton-street, S.W.
Fisher, Charles	Whitehaven.
Sedley, Angelo James.	40, Langham-street, Portland-place, S.W.
Simpkinson, Francis.	67, Victoria-street, Westminster, S.W.
Sone, John	23, Fenchurch street, E.C.
Sworder, Thomas	Bedford-road, Luton.

The following candidates were balloted for and duly elected members of the Society:—

Buncombe, Charles Hope	4, York-place, Mile-end, E.
Chanter, Thos. Burnard	Bideford.
Dalziel, George	9, St. George's terrace, Regent's-park, N.W.
Denham, Wm. Graham	48, Kent-street, Southwark, S.E.
Girdwood, William	Old Park, Belfast.
Ramsden, James	Abbot's Wood, Ulverstone.
Rouch, Wm. White	180, Strand, W.C.
Schneider, H. W.	17, Gracechurch-street, E.C.
Smith, Augustus	Wentworth-street, N.E.
Whetham, Charles	52, Gordon-square, W.C.; and Bridport, Dorset.

The following Institution has been taken into Union since the last announcement:—

Notting Hill, Working Men's Association.

The Paper read was—

FILTRATION AND FILTERING MEDIA.

BY JULIUS G. DAHLKE.

In the observations which I shall have the honour of addressing to this Society, upon Filtration and Filtering Media, I propose to deal with the subject in a popular and practical manner, rather than to treat it in an abstract and exclusively scientific spirit. But, before entering upon it, you will permit me to say that, having been but a short time resident in England, I have not yet succeeded in sufficiently conquering the difficulties of the language, so as to express myself as clearly as is desirable. Errors in phraseology and pronunciation will therefore occur; but with the usual generosity of Englishmen, you will remember my actual position and grant the indulgence of which I shall stand in so much need.

From various modern works upon the civilisation of the Egyptians, Chinese, Japanese, and other ancient oriental nations, we learn that at a very early period filters were used by them. These appear to have been vessels made of unglazed earthenware, or of porous stone. There is no evidence to show either that they were acquainted with the true nature of those matters which should be separated from water intended for the use of man; or that they had studied the subject of filtration in a scientific spirit. In this neglect Europe imitated them until near the close of the seventeenth or beginning of the eighteenth century, when the French began to pay attention to the subject, and employed silk, wool, cotton, sponge and sand, as their filtering media. But about the middle of last century a lias was discovered in Picardy, which, owing to its effective action, came largely into use. The mode of using it was particularly simple, being in the form of a false bottom placed in the cistern, through which the water descended. Afterwards, the attention of Englishmen was directed to the subject, and about 70 years ago filters were introduced which contained three layers of media, viz., sand, gravel, and charcoal. These were for filtering by descent, but another system was subsequently adopted and patented for filtering by ascent; this, however, was complicated, and never became in any way largely known.

The French seem to have resumed their lead by improving their apparatus; still, however, and although many alterations were made, and minor improvements introduced, nothing of any consequence was effected until very recently, when another body of persons again took up the subject in England, where filtration is now very commonly adopted.

The same media have been employed in various ways; the chief modern efforts in the way of effecting improvements having been, with only a few exceptions, rather artificially to increase the pressure, and so to increase the rate of filtration, than to improve the character of the media employed.

The multitude of recent inventions in connection with filtering apparatus is so great that it would occupy far too much time for me to mention them. It is sufficient to say that there is hardly a porous substance in existence which has not been employed for filtering purposes. At one time, wool and cotton were the filtering agents most widely adopted, but their use was abandoned, because, after being exposed to moisture, they undergo decomposition. Asbestos cloth has been proposed as a substitute for them, but it does not appear to have found much favour.

* Richard is supposed to be lying on the bed of Vidomar Viscount de Limoges, whose Castle of Chalus he has taken by storm.

During the past seventy years, gravel, sand, and charcoal, used as a mixture, have been the agents most in vogue amongst filter makers, and it is only lately that due attention has been paid to charcoal as the most efficient filtering medium. Its use is much more frequent now, because not only has it a powerful detergent effect, but it possesses also the peculiar advantage of not becoming foul, while it protects from decomposition other bodies in contact with it.

It has been often asked why animal charcoal is so effective as a filtering medium? Some attribute this to the presence of so much carbon; but that this is an insufficient reason, is shown by the fact that, although coke contains more carbon than sand, yet it is not superior as a filtering agent.

Animal charcoal filters about three and a half times more rapidly than either coke or sand, while it is also greatly superior in this, that it removes many inorganic impurities held in solution, over which the former substances exert no power.

It appears that the more porosity a filtering medium possesses in itself, the more rapidly does it filter, and the greater is the effect it produces on the water. The latter will be still more decided when, with a greater porosity, peculiar substances are combined.

This leads me to believe that we may attribute the extraordinary filtering quality of animal charcoal to the fact that its principal component parts are lime and carbon, so combined as to secure a wonderfully fine porosity. Vegetable charcoal, although very porous, and containing far more carbon, has less effect on water.

I have observed that another substance, of which I shall presently speak, and which (although of an entirely different origin) possesses great similarity in this respect, may in many cases be successfully substituted for animal charcoal. Indeed there are doubtless numerous substances and compounds which may be used with as great effect. Do we not see that nature supplies the most beautiful waters from limestone beds? It is hardly necessary to say, could we but imitate her action, that we should be able to do more in this as well as in other things, but we must content ourselves with as much success as our defective knowledge of her laws will permit us.

Although we know of powerful agents for the removal of different impurities from water, circumstances may and do interpose which render it extremely difficult to obtain the medium in the requisite form for our purpose, and there is nothing yet discovered which will perfectly meet all the requirements of the case. Those who assert that it is possible to construct an apparatus to act as a universal filter for purifying any kind of water effectively, whatever may be the impurities, remind me of the vendors of certain patent medicines, who vaunt their nostrums as capable of curing every disease. Their claims are about equally trustworthy.

I should classify the art of filtration into three systems, viz.:—1st, where the action takes place simply on the surface of the filtering medium; 2nd, where the whole bulk of the filtering medium is calculated to operate on the water, and the detergent effect in its most delicate form may be produced; and, 3rd, where both of these systems are conjointly employed.

The first system requires a filtering medium of such a fine porosity that its pores must be smaller than the minute particles composing the impurities suspended in the water. Such an agent of course must sooner become clogged than a filtering medium of coarser porosity, and which is meant to act with its whole bulk on the water. But both systems employed together may prove to be useful in several instances, as in the case of domestic filters. The greatest failing of these is that they must become clogged, and the more they are liable to this, the more effectively they act. We often hear of self-cleansing domestic filters, but the fact is that no invention of the kind has been made yet, without involving complications too great for the purposes of ordinary domestic use.

However, it is not difficult to make a filter for general domestic purposes—although the effective self-cleansing of such an apparatus is still a problem to be solved.

If the filtering medium employed in this case be solid, and of a fine porosity in its upper part, the clogging impurities will not only be retained on the surface, but may be easily removed by scraping; and then, if the lower part of the filtering medium be prepared of a material capable of producing a detergent effect, it will act the more readily through not being interfered with by the rougher and clogging impurities.

It should be remembered, too, that in most cases we have here only to deal with some rougher impurities which have found their way into the water on its passage from the waterworks, or other source, to the tap of the consumer.

Being deeply interested in the subject of filtration, I have never omitted an opportunity of carefully inspecting those house cisterns which came under my observation; I have, however, seen but few to which the attention necessary to secure the due cleansing had been paid. Most of them were loaded with mud, and in some of them I actually noticed the growth of vegetation (fungi). I conclude, from my observations, that hardly one-fourth of the house cisterns in London are in such a condition as to afford the consumer a supply of wholesome water like that which flows from the main.

The difficulty, or I may say the impossibility, of keeping water which is stored in cisterns entirely free from accidental contamination, should lead us to provide a domestic filter capable of removing chemical impurities, as, for example, any lead which may be held in solution; in fact, the practice of filtering water preserved in cisterns and intended for domestic use cannot be too warmly recommended.

To remove lead from water, Professor Faraday recommends the practice of stirring up animal charcoal with the water so contaminated, the same being then allowed to settle. I have found, however, that, by using this material in a manner to be described hereafter, I never failed in producing the same effect by means of filtration.

It is easy enough to purify small quantities of water, but the greater the quantity the greater are the difficulties of purification, especially when a certain chemical effect has to be produced.

It will not be necessary for me to dwell upon the filtering processes required for large water-works, as the supply is generally taken from such sources that the common sand filter-bed answers the purpose; and where the water is too hard for domestic uses, the beautiful process of Dr. Clark will meet and remedy the evil.

Experience shows that it is not prudent to adopt the same means of purification for every kind of water, and I should make a difference in the treatment of the water used for domestic and that employed for manufacturing purposes. In the latter it will be often of the greatest importance to have the water as pure as possible, whereas certain so-called impurities in water may not be at all injurious to health. When we consider that no one would call human blood impure which contained 420 grains of saline matter per gallon, I do not know that we are justified (of course, speaking in relation to health) in calling water impure which contains small quantities of certain saline matters, particularly when we have no medical evidence that the small portions of them drunk in such water ever did any harm. Besides which, it should be remarked that the quantity of lime and magnesian salts drunk in water must be greatly exceeded in amount by that which enters the system in the food.

Only those waters which contain much sulphate of lime and magnesia have been observed to derange the process of digestion—as for instance, the waters of the New Red Sandstone.

Too pure water is distasteful, and unfitted for drinking purposes. In a case which came under my observation, the water taken from a certain well, having a flat and disagreeable taste, proved on analysis to be remarkably free from impurities. In order to make this water more fit,

or perhaps only more agreeable for use, I made such arrangements, that before it was filtered through a body of animal charcoal, some finely-dissolved organic impurities were added to it, and which were of course acted upon by the charcoal. I found that the mixed water had a pleasant taste after filtration, and even that it was somewhat sparkling, though I failed to recognise any difference in the unmixed water after it had passed through the same filter.

There are cases where no good sources are available, and waters of all kinds must be used; it may therefore be perhaps of some interest to illustrate such a case; but before doing so I shall make a few remarks as to the nature of the filtering media which I prefer to employ.

Solid filtering media have great mechanical advantages; however, I do not contend for their exclusive use, as I find it often advantageous to have loose filtering media employed conjointly with solids.

Experience has convinced me that we could not employ a more powerful and efficient filtering medium than pure animal charcoal, in a well-regulated, fine, porous, and solid state. Unfortunately, however, no method has yet, to my knowledge, been discovered by which this substance can be moulded into a convenient shape without diminishing more or less its filtering qualities. What is required is some material which will bind the particles together without glazing them.

Attempts have been made to produce solid animal charcoal filters by moulding the charcoal with the aid of bitumen and carbonising the latter; but it appears that the object in view cannot be arrived at in this way. In the first instance, as the proper consistency is not gained; next, by becoming glazed the charcoal loses many of its good qualities, and, at least, its rapidity in action will be diminished from its becoming less porous.

Another serious objection to this medium, which is really a mixture of charcoal and coke, is to be found in the fact that the filtering power of charcoal stands to coke as 15 to 4.

Mineral bitumen (*i.e.*, coal-tar and coal-pitch) will produce this fatal defect in a higher degree than vegetable bitumen, as it leaves more solid residue after carbonisation; but animal charcoal will not adhere to it, and will not bind sufficiently, even when a great quantity of it is used, unless some vegetable charcoal is added. This in itself might not be looked upon as a great drawback,—although it has not the filtering quality of animal charcoal—if it served to preserve the latter from the glazing effects of the carbonized bitumen, but it does not do this.

Many well-known solid filtering media are used, but it is with them as with every other article in the market, some are very good and highly commendable—others less so, much of course depending upon the manner in which they are used, and the special purpose for which they were intended.

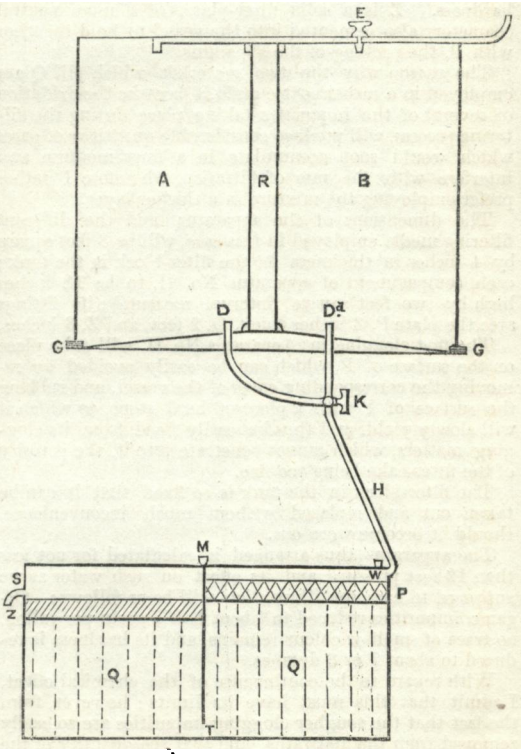
I will now describe a composition which I have used with much success, but before doing so, I beg it may be distinctly understood that it is not my intention to place it above all other compositions, or to question the utility of similar filtering media.

From the fact that the porosity of charcoal is greater than that of any other filtering agent, it is obvious that I should wish to employ it in my solid medium in as great a quantity as possible. However, finding, as I have stated before, that it is impossible to make it into a solid body without impairing its quality, I tried to discover a material which could be used as a substitute for it. Being in some degree familiar with the use of the residue which the Torbane-hill mineral, sometimes called Boghead coal, leaves after distillation, I turned my attention to it. After some experiments, I found that this substance, when moulded with bitumen, ceased to be effective, as is the case with animal charcoal. I, however, eventually discovered that this material, when saturated with oily or fatty matter, will easily adhere by the addition of a comparatively small quantity of clay, and can so be readily moulded. When well burnt, this mixture furnishes a very powerful filtering medium; it will remove colour and smell from water, and will reduce its hardness considerably, while at the same time its rate of filtration equals that of charcoal. In fact, recent discoveries have led me to the belief that the residue of the Torbane-hill mineral alluded to, deserves more attention than has hitherto been paid to it, for it appears to possess many valuable properties which have been vainly sought in other bodies; but having not yet finished my researches, I must confine myself on this occasion to speaking of it merely with regard to its application to filtering purposes.

To make the mixture more effective, I add to it bone-dust, not only for the sake of the animal charcoal, but because it must necessarily shrink in the charring, an effect which enables me to regulate with great nicety the porosity of the filtering medium beforehand; for I find that the porosity of the mixture mainly depends upon the quantity and grain of the bone-dust which enters into its composition. I have also found that the use of oil instead of water for moistening the clay, prevents the too great shrinking of the moulded mass in the drying and firing process.

By means of the process just described, I can produce filter-blocks of considerable size and of various shapes, by the use of which I am enabled to overcome a great many difficulties, and to work large quantities of water with a comparatively small filtering apparatus.

Supposing 5,000 gallons of water are daily required to be purified, that the water supplied contains 9 grains of organic impurities per gallon, has a bad smell, is highly coloured, and is of 17 degrees of hardness, I should employ an apparatus of which a woodcut is given.



The upper part is a tank, made from slate, completely closed, and is divided into two compartments by means of a solid filter-block with one inlet and one outlet for each of them. The supply-pipe is provided with a three-way cock (E), which allows the necessary arrangement to be made for admitting the water to one compartment of the

tank, and for causing it to pass into the other through the filter-block. If, for instance, it enters at A, it has to pass through R into B, flow off by Dd, and through K and H into the second apparatus.

This tank, being only intended to free the water from the rougher and clogging impurities, its action is to be reversed as often as may appear necessary in order to remove the collected sediment. This is easily done by shutting off the supply-pipe for A, and opening that for B; but before the water is allowed to enter the connecting pipe of the second apparatus, the accumulated impurities must be removed through the opening of the corresponding plug G, and, that it may flow off easily, the bottoms of the two compartments are inclined towards the plugs.

The two walls of the tank which face the filtering medium, are so fixed, that they can be opened from time to time, in order that the surface of the filter may be scoured, it being of such a consistency that its surface can be easily abraded by rubbing with hard stone.

The water is thus freed from its coarser organic impurities, so far that they cannot possibly clog the second apparatus, which is thus retained almost entirely for chemical action on the water. It consists of a vessel which is also completely closed, with one inlet (W), and one outlet (S), divided from M to T, and fitted in the following manner:—P is a solid filter-block, cemented into the apparatus and covering the whole surface of the body Q, thus forming the top part of this filter; it is of much finer porosity than the filtering-block in the tank, in order to separate the finer particles of organic matter from the water. The space Q is filled up with coarse granular charcoal and a preparation of the Torbane-hill mineral spoken of, intended to operate upon the water so as to remove those matters held in solution, which impart colour, smell, and hardness. Z is a solid filter-plate, of a more neutral character, also cemented into the vessel to hold together with P, the packing of the apparatus.

The reason why the two materials which fill Q are employed in a rather coarse grain, is, because the oxidation of several of the impurities taking place during the filtering process, will produce considerable quantities of gases which would soon accumulate in a finer medium and interfere with the rate of filtration, wherefore I rather prefer employing the mixture in a thicker layer.

The dimensions of the apparatus, and the different filtering media employed in this case, will be 3 feet square by 4 inches in thickness for the filter-block in the tank; each compartment of apparatus No. II. to be 18 inches high by two feet square (internal measure); its fittings are: the plate P, 3 inches thick, Q, 2 feet, and Z, 3 inches.

The first clogging in Apparatus No. II. will take place on the surface of P, which can be easily avoided by removing the corresponding cover of the vessel, and rubbing the surface of P with a piece of hard stone, to which it will slowly yield, and thus be easily freed from its clogging matters, which cannot penetrate into it, the porosity of the filter-cake being too fine.

The filter-block in the tank is so fixed that it can be taken out and replaced without much inconvenience, should it become worn out.

The apparatus thus arranged is calculated for not less than 12 feet pressure, and its effect on such water as we supposed to have for illustration will be as follows:—Organic impurities reduced to about half a grain per gallon, no trace of smell or colour remains, and its hardness is reduced to about 7 or 8 degrees.

With regard to the continuance of the chemical effect, I admit that this must have its limits; however, from the fact that the rougher clogging impurities are so easily removed from the apparatus, and that the quantity of the inorganic impurities which will be absorbed must necessarily be comparatively small, a good portion of them escaping in the form of gas, I do not hesitate to assert that it can be successfully employed, for a considerable time, before the filtering agents get exhausted, and repacking is required.

I do not believe it would be possible to work such a quantity of water so effectively and lastingly in such a small apparatus, if the whole of the filtering medium were to be used in a loose state, as its porosity in the latter case could not be condensed to the state of fineness required.

This apparatus being only meant to serve for the special purpose I spoke of, it is obvious that it will have to be altered according to circumstances, both as regards the filtering agents to be employed, and its mechanical arrangements.

If the quantity of water to be filtered be so great that a very large filter-bed is required, I prefer employing the preparation of the Torbane-hill mineral, as described in a granular state, rather than sand; for this reason, that it filters more than three times as quick, and is five times as light as the latter; consequently a ton of it will, by a layer of equal thickness, filter about 16 times the quantity of water that a ton of sand would filter, with the advantage that the filtering would produce at the same time a greater decolorising effect and a considerable softening of the water. A clogging from the precipitation of chalk is not likely to take place, as this substance is separated in a crystalline and granular state. Moreover, those particles of the material which become saturated with organic impurities may, through calcination, regain the greater part of their former efficiency.

I may remark, in conclusion, that filtration is not often resorted to on the Continent, with the exception of France and Holland. Manufacturers are very much afraid of adopting any improvements that demand an outlay of capital, and so in this case they will often prefer using impure water to spending their money upon apparatus for purifying it.

As for the water used for domestic purposes in Germany, the people are so apt to look up to a paternal government, even in matters concerning their health, that they never think of purifying the water supplied to them. To this apathy of the public may be ascribed in a great degree the comparative failure of the English water-works at Berlin.

DISCUSSION.

Mr. SPENCER would not have intruded any remarks upon the meeting had it not been that he considered that the precepts laid down by Mr. Dahlke in his paper and his practice did not coincide. He (Mr. Spencer), having been informed that Mr. Dahlke's filters contained charcoal as the filtering medium, had the curiosity to break one of them open, when he found it to contain about one inch and a half of charcoal, with about 10 per cent. of magnetic oxide of iron. They had thus heard a description of a filtering medium with the principal element omitted—viz., the magnetic oxide of iron, which was, in his opinion, the active principle in Mr. Dahlke's filter. He had observed this medium to be the one employed by nature, for he found it to exist in all stratifications where the water was pure. Even if the surface of the soil were ever so foul, where the water percolated through certain rocks, such as the Malvern hills, which contained magnetic oxide of iron in great abundance, it was purified. He had been largely engaged in connection with some of the water companies in the purification of water, and he had set himself to work in order to discover, if possible, the effect of this magnetic oxide of iron upon water when used artificially as a filtering medium. He was not there, however, to give a lecture upon his own mode of filtration, but simply to say that, however well Mr. Dahlke's filters might act with charcoal, clay and silica, yet their special power, he contended, was dependent upon a certain proportion of the magnetic oxide of iron, the presence of which, in Mr. Dahlke's filtering medium, he had tested by the magnet. The use of this material as a filtering medium he (Mr. Spencer) laid some claim to.

Mr. ATKINS said that Mr. Dahlke had rather depreciated the powers of carbon when used alone as a filtering me-

dium. He (Mr. Atkins) had manufactured some 40,000 or 50,000 blocks of carbon for filtering purposes, and could state that it had a most powerful effect in deodorising and purifying water. He had directed his attention to this subject for the last 12 years, and had experimented upon charcoal in many different forms as a purifier of bad water, and he was glad to find that the Moulded Carbon Company had introduced balls of carbon for filtering purposes. Oxygen was a great decomposer of the pernicious matter found in water, and this agent was brought to bear in an admirable manner by means of the great porosity of the carbon. He thought the failure of their efforts hitherto had been owing to their not having exposed the carbon to the action of the atmosphere after the water had passed through it. He contended that a simple ball of carbon was capable of accomplishing all they required as a purifying medium. He did not say that it was so effective as other means might be in correcting certain chemical impurities of water, but he contended that simplicity should be the object in a filter, and he thought the properties of carbon as a purifier of water should be well weighed before it was condemned. It was perhaps the most useful and most practical material for those purposes to be found in nature; and when they obtained it pure, and applied it in a convenient form, he was convinced that they had a most valuable purifying agent. He was so convinced of its efficacy when properly applied, that, when the Moulded Carbon Company were in want of funds, he (Mr. Atkins) took the matter up and spent many thousands of pounds upon it. He called upon the meeting to give carbon a fair consideration before they condemned it as a filtering medium.

Dr. WALLER LEWIS could give no details as to the efficiency of the filter which Mr. Dahlke had described as compared with other filters, but he could say, from his personal experience in a very large public department, that the filter as supplied by Mr. Dahlke was very efficient in deodorising and decolourising water, as well as in the removal of a very considerable amount of organic and inorganic impurities with which they were so bountifully supplied by the water companies of the metropolis. Whether or not this filter was better than others he did not pretend to say, because he had had no great amount of experience with other descriptions of filters. He would make one remark upon the expression in the paper, that too pure water was distasteful and unfitted for drinking purposes. That view was new to him. He was afraid that Mr. Dahlke was assuming a position he could not maintain. Unfortunately, in London and many other large towns in this country and on the continent, they were no judges of what pure water was, for they never got it. Their palates were so disorganised by being supplied with water that was not pure, but charged with salts of lime and other impurities, and the nerves of taste were in such a condition, that when they tasted really pure water they could not appreciate it. He had tasted some of the purest water that was to be found anywhere, viz., that of the Lake of Bala, in North Wales, which flowed through a bed of primitive rock. That water contained 1½ grain of inorganic matter per gallon, and persons who had been accustomed to the water of London considered the water to which he referred unfit for drinking, and did not at first like it at all. It was certainly new to him to hear that perfectly pure water was unfit for drinking.

Mr. PAINTER regretted that Mr. Dahlke had not dwelt more upon the admixture of silica with carbon. If the removal of organic impurities from water depended upon the power of absorption of the filtering medium, he thought silica possessed very little absorbing power. He thought the filtering medium should be as dense as it could be, consistent with a proper amount of porosity. The finer the filtering medium was, the more attenuated must be the stream of water that passed through it; and if surface filtration had anything to do with it, the larger the surface was, the greater the effect. According to the doctrine of Professor Stenhouse, the finer the porosity was, the better was the quality of the water, and quality ought to be studied before quantity; besides, quantity could always be regulated by the amount of filtering surface that was supplied. With a carbon ball of six inches diameter, he could filter water at a rate sufficient for most practical purposes, and by increasing the size of the ball, the quantity could be proportionately increased. Such a filter did not require to be cleaned oftener than two or three times a year, with such water as was supsuplied by the New River Company; and even if it required to be cleansed half-a-dozen times in a year this would be no bar to its use. Balls were more easily cleansed than plates by blowing air through them, by means of which the accumulated impurities were easily removed. He thought that method of expelling the dirt was better than producing reversed currents of water on Mr. Dahlke's plan, as in the latter case they must use the impure water which the filter was intended to remedy. A small carbon ball of three inches diameter would filter from three to four gallons per day. The impurities did not penetrate more than one-sixteenth of an inch into the ball, and it could be easily cleansed. If that were the result upon a small scale, he considered that the objection that they could not purify a large quantity of water with a carbon medium did not hold good. The Moulded Carbon Company deserved the highest credit for the form in which they had introduced carbon for filtering purposes. The adaptation of carbon as a filtering medium, he believed, emanated from Germany, and in a short time the poor man would be able to procure, for two shillings, a filter which would purify four gallons of water per day. He was rather surprised to hear the recommendation given to put the denser portion of the filtering material upon the outer portion of the plate, and he was at present at a loss to understand the benefit that was gained by so doing. Some objection had been taken to the alleged glazing of the carbon ball as prepared by the Moulded Carbon Company, but he might state that the glazing extended no farther than the surface, and the ball, upon being broken, would be found to be perfectly unglazed throughout the whole of its interior. The glazing on the outside was caused by the mould in which the ball was prepared, and the porosity was not in any way diminished. The ball was composed entirely of pure charcoal, without any admixture of silica. The base of the material was entirely carbonaceous; and if carbon were regarded as the proper medium for filtering purposes, he would say the moulded carbon filter combined the qualities of being easily cleansed, easily fixed, and of taking up very little room, which, he thought, were all the qualifications that could be desired in a filter.

Mr. DANCHELL begged to state, in reference to the statement that the use of carbon blocks was a German invention, that as early as the year 1847 he had manufactured filters with carbon blocks as a filtering medium, but having had time enough maturely to consider the subject, he found these did not answer, and therefore he abandoned the use of them. He now used pure animal charcoal, in a granulated state, without other admixture of any kind.

Mr. WENTWORTH L. SCOTT would mention that he had been called upon to make various experiments to test the comparative merits of vegetable and animal charcoal as a filtering medium, and they resulted, as regarded the absorption of organic matter, in favour of animal charcoal. With respect to the Moulded Carbon Company's balls, the defect appeared to be that the central hollow, or aperture, was in many cases on one side, and this, in a small ball, would evidently modify the action of the filter. With water containing a more than ordinary amount of organic matter, he found that animal charcoal exercised the most powerful purifying effect.

Mr. MORGAN remarked that, after all, experience was the best test. He thought they might very well leave the relative merits of the various descriptions of filters to be decided by the public. The first speaker had impugned the originality of Mr. Dahlke's invention, and had alluded to a supposed infringement of his own patent;

but he (Mr. Morgan) had not understood Mr. Dahlke as setting up his plan in preference to all others. With respect to the supposed infringement of Mr. Spencer's plan of using magnetic oxide of iron, he had no doubt that Mr. Dahlke would be able to give such an explanation as would set Mr. Spencer's mind at rest upon that subject.

Mr. DAHLKE, in replying upon the discussion, said with regard to Mr. Spencer having found magnetic oxide of iron in the filtering medium he employed, if that were the case he could assure Mr. Spencer that it was no infringement of his patent, because the presence of iron in his medium was solely due to the fact that the preparation of Torbane-hill mineral sometimes contained iron. After distillation, there was a residuum of ash which very much resembled animal charcoal in appearance, and sometimes a portion of oxide of iron was found amongst it. If, therefore, Mr. Spencer had found that substance in his filtering medium, it was solely due to that circumstance; for it was no part of his plan to use a distinct preparation of iron. He was not aware that there was any passage in his paper in which he had disputed the properties of magnetic oxide of iron; in fact, he was not aware that he had alluded to it at all, whilst he had fairly stated his opinion with regard to the moulded carbon. He would call their attention to one remark that had fallen from Mr. Painter. He understood that gentleman to state that a filter capable of purifying a very large quantity of water per day did not require cleansing oftener than five or six times in a year. If that were so, he should be glad to know where the impurities went to? They must go somewhere. If the filter acted properly, it must collect the impurities from the water, and the best filter was that which retained the impurities in a manner which admitted of their being easily removed; and if a filter required cleansing only to the extent stated by Mr. Painter, he (Mr. Dahlke) was inclined to doubt the efficiency of such an apparatus in collecting the impurities of the water.

Mr. SPENCER begged to be allowed to disclaim any intention of discourtesy towards Mr. Dahlke.

The CHAIRMAN, in proposing a vote of thanks to Mr. Dahlke for his paper, said they were at all times much indebted to gentlemen who had devoted their attention to such an important matter as this in a sanitary point of view, for giving them the results of many years study of the subject. They were not a court to decide between the legal claims of rival inventors, but their thanks were due to any one who came forward to furnish them with information that might be of public advantage. He confessed he was unable himself to throw any light upon this subject. He had not studied it sufficiently, but he had been much pleased with the paper they had heard. As far as he could judge, it appeared to be an excellent method of filtration. There might be others equally good, for anything he knew, but upon that the meeting gave no opinion. He had now simply to propose that the thanks of the meeting be given to Mr. Dahlke for his paper.

The vote of thanks having been passed,

The Secretary announced that on Wednesday evening next a Paper, by Mr. P. L. Simmonds, "On the Trade and Commerce of the Eastern Archipelago," would be read. On this evening, J. Crawfurd, Esq., F.R.S., late Governor of Singapore, will preside.

Home Correspondence.

COLORING STATUES AND THE ARRANGEMENT OF WORKS OF ART.

The following letter has been addressed by the Very Rev. the Dean of St. Paul's, to Mr. Bell:—

MY DEAR SIR,—I regret much that I cannot attend at the Society of Arts, on the occasion of your lecture, but an engagement at dinner renders that impossible.

I have read with much interest your paper, in its present uncorrected form, and shall be glad to see it without its misprints. There is much truth, I suspect, in your distinction of the statue and the idol; you might add that *costliness* of material was everything in the latter, as showing the devotion of the worshipper.

I have entered into the subject in "The History of Latin Christianity" under Iconoclasm, in another form. The pictures and statues chiefly *worshipped* were in general wretched as art.

Believe me, my dear sir,
Ever faithfully yours,
H. H. MILMAN.

Deanery, St. Paul's, April 23, 1861.

SIR,—I shall be obliged by your allowing me to correct, in the next number of the *Journal*, three important errors in the report of my remarks on Mr. Bell's paper, on Wednesday evening last. The first is, where I am said to speak of "Milo," as the master of Phidias. We know of no sculptor of that name. It should be "Myron," the supposed author of the original (in bronze) of the statue of the Discobolus, in the British Museum. The other mistakes are, where I am said to refer to "Nicias, as the brother-in-law and (decorating) assistant of Phidias." I stated that the artist who assisted Phidias, in the great works alluded to, was Panœus or Panœnus. Nicias lived later, and is correctly associated with Praxiteles, in the story told of that sculptor, in a subsequent passage.

I will add, that I seem also to have been misunderstood by one of the gentlemen who addressed the meeting in the intention of my remarks on the colors of the walls and the heavy character of the ceilings of the sculpture-galleries of the British Museum. My observations were not directed against the decoration, *per se*, which exhibits, in many respects, both good taste and judgment, but in its relation to, and its effect upon the objects exhibited in the rooms. Apologising for troubling you with this note, I am, &c.,

RICHARD WESTMACOTT.

1, Kensington-gate, W., April 29, 1861.

SIR,—As an attentive listener to the very practical and instructive discourse of Mr. John Bell and the discussion which followed, I was much pleased with the sound views advanced. In the union of painting and sculpture, however, I hardly think objection enough was taken to the damaging effect of newly wrought marble upon oil pictures, especially when placed in connexion with the latter, the detriment to paintings being so great as almost to cause the prohibition of sculptures in the same gallery, which, apart from their brilliant whiteness, have the advantage of a tangible reality detrimental to a purely imitative art, an objection that ceases to exist in the case of architectural decoration and fresco paintings, which, though often of the highest class of art, have less of pictorial than mural character, being rather aids to architecture than existing independently of it. As an artist, I do not hesitate to say that the most gaudily painted image would be preferable next an oil picture to the finest work of Art in marble or plaster, *if left white*, a rule that holds good with antique marbles, though in a lesser degree, their fragmentary character and low tone of color rendering them less impertinent and obtrusive. In these remarks I do not discuss the aid or degradation sculpture may suffer from color; I merely state that if sculptures be brought into connexion with an imitative art upon a flat surface, that imitative art will be benefited by the sculptures partaking somewhat of its character, as may be instanced in the case of those grandly painted figures around the altar pieces of continental cathedrals, which are so beautifully blended with the pictures that you can hardly discern where the frame (or fore-ground) ends, and the imitative art begins. I do not say that two noble arts may not be and are

not degraded, and that they ought not to exist save apart. Here at least the unity is complete. If painting cannot be sculpture, sculpture may be painted, or at least stained, as old Time takes care it shall be. Cannot sculptors tone down their works before introducing them in connexion with paintings in oil? At the Paris Exhibition of 1855, the pictures suffered from being near sculpture, though from the width of the gallery, and their being placed at the intersections, or crossings, in a very slight degree. This, perhaps, in a miscellaneous gallery, was the most successful union ever effected. The *tout ensemble* was decidedly improved, and the fortunate sculptor done justice to, but slightly to the detriment of pictorial art.

I am, &c., JOHN LEIGHTON.

MECHANICS' INSTITUTIONS.

SIR,—It has long been a reproach against the numerous Institutions which have now been established in almost every town and village throughout the kingdom, that they are only Mechanics' Institutes by name; that for the purpose for which they were originally designed, of educating our artisans in the principles of science, they have altogether failed, and that, so far from being schools for adult instruction they have degenerated into news-rooms, lecture halls, and places for intellectual recreation. This may be true to a certain extent, but the charge will by no means apply to a large number of the Institutes within the Yorkshire Union. Much, however, may be said in extenuation of the charge when the low state of education which existed a few years since is considered, the little desire there was for mental cultivation, and the necessity for that preparation which has now in some measure been effected.

The first important step in the right direction was the establishment of the Society of Arts Examinations, which, by giving an appreciable value to certain branches of knowledge, afforded a practical stimulus to application; and as every year gives additional experience of the value of the certificates awarded, their influence is becoming more widely extended. From the smaller Institutes candidates are becoming more numerous, and each success is stimulating new aspirants to distinction, and doing more real good to self-improvement than appears by mere statistical results.

There was wanted, however, something more; there was needed the link which should connect the youth who had but an imperfect acquaintance with the rudiments of learning—owing to the demands of labour shortening his school days—with the more advanced scholar who might enter the lists with a reasonable prospect of success. To the youth of twelve, or perhaps younger, whose days were devoted to toil, the limit of sixteen fixed by the Society of Arts, and the attainments required, rendered the certificate which might prove so great a boon, a prize too far beyond his reach even to strive for, and, therefore, to the youth of the working classes it afforded no stimulus and exercised no influence. The missing link will, however, be supplied by the Elementary Examinations under the auspices of the Central Committee of Educational Unions in connection with the Society of Arts. The impetus which the acknowledgment of merit gives to industrial exertion, will commence with the lowest step, and we shall doubtless witness the good effects in a large addition to the number of candidates for the certificates of the Society of Arts.

Another important advantage will be gained by the formation of classes for instruction in elementary science by teachers who hold the certificate of the Department of Science and Art at South Kensington. Not only is the teacher stimulated to exertion by his reward depending on the success of his teaching as shown by the attainments of his pupils, but the latter are encouraged by the award of prizes, which it is hoped will have the effect, when the system is more generally known, of promoting that education of artisans in the principles of science which may be considered the primary and ostensible object of Mechanics' Institutes.

But no scheme, however judiciously devised, will prove successful unless its benefits and the modes of obtaining them are brought prominently and continuously before the people for whom they are intended. Advertising and publicity are as necessary to educational movements as to quack nostrums, and I would suggest that the committee of every Institute should by circulars, bills, and occasional public meetings, make the several advantages to which I have alluded as widely known as possible. The benefits to be gained, and the mode by which they may be gained, should be kept constantly before the public of each locality; every Institute should be an office in which information on all matters of detail may be obtained, and without being discouraged by apparent obstacles the idea should be steadily kept in view, that success in a good cause is the sure reward of perseverance.

I have heard it suggested that the Central Committee of Educational Unions for Elementary Examinations should include the representatives of local boards. There might be some advantage in this, but experience has abundantly shown that a numerous committee is impracticable for any useful purpose. In the multitude of counsellors there may be safety, but far more business is done by a few.

I am, &c., BARNETT BLAKE.

Leeds, April, 1861.

Proceedings of Institutions.

FARNHAM YOUNG MEN'S ASSOCIATION.—The second triennial report of this association states that it is rapidly advancing in the accomplishment of those ends for which it was established, viz., "mutual improvement, moral and religious, as well as intellectual;" these objects being attained by friendly intercourse amongst a carefully selected body of members, the establishment of a library and reading room, the formation of various sections, and the delivery of first.class lectures once a fortnight during the winter session. The Association now numbers 27 honorary members, 110 ordinary members, and 78 lady members. The committee confidently appeal to this report, and think they may take great encouragement for the future from its general tenour, at the same they would remind each individual member of the association that no satisfactorily permanent results can follow the efforts of an elected committee for the good of the society at large, unless eaeh member shall use his best endeavour to maintain and advance its good name, and to promote its well-being by every means in his power. In their last report, the committee stated that "since the first formation of the association a library of 481 volumes had been collected, 96 of which had been purchased during the year 1856;" they now announce that the library contains no less a number than 938 volumes, showing an increase by purchase of 457 volumes since September 1st, 1856. The money expended on the library during the three years ending September 1st, 1859, has amounted to £146 1s. 11d., or an annual average of £48 13s. 11¾d.; the items of which are,—for books £111 12s. 7d.; for periodicals £21 5s. 6d., many of which are now bound; for binding £7 8s. 8d.; and for incidentals £5 15s. 2d. The committee have constantly regretted that the state of the funds did not permit of a library catalogue being published more frequently than has yet been done; still it will be absolutely necessary that another "supplement" should be printed shortly. The issue of books to the members for home-reading has been attended with very pleasing results; between October 1st, 1856, and October 1st, 1857, 1556 volumes were put in circulation, besides a large number of monthly parts of serials; between October 1st, 1857, and October 1st, 1858, 2424 volumes were issued, showing an increase on the previous year of 878 volumes. This would give an average of about 11 volumes to each member, supposing every member on the list to have availed himself of the library. There were

also issued in that year 443 monthly parts of serials, or nearly 37 per month. The committee feel sure that when the returns are made up for 1858-9, a still further increase will be manifest; these returns are a very strong evidence of the manner in which the library is appreciated by the members generally. The attractions of the reading room have also been much increased since September, 1856; a large number of papers and periodicals being furnished for the use of the subscribers. Since the publication of the first triennial report three new sections of the association have been formed, viz:—A chess section, the meetings of which are held in the reading room, of which Mr. T. R. Patterson is the Secretary. A philharmonic section, (of which there is an elementary branch conducted by Mr. Wonnacott on Thursday evenings) which holds its meetings in the lecture room on every Monday evening; Conductor, Mr. Nuske; Secretary, Mr. J. J. Bevan. This section has given several open nights, to which the members of the association, and friends of the performers were admitted free. An elocution section, which holds its meetings in the lecture room on every Tuesday evening; Secretary, Mr. F. J. Turner. The last Tuesday in every month is an open night, to which members of the association are admitted free; a further privilege of introducing two friends being granted to the members of the section. The following lectures have been delivered during the sessions which have occurred since the last report was published:—"The Food of Man," Rev. M. Harrison; "Entomology," Rev. W. H. Hawker; "On Norway," Rev. T. Bacon; "Discoveries in Light," Rev. Canon Carus; "The Planets—and whether they be all Inhabited," Rev. Mark Cooper; "The Microscope," Rev. H. R. Rynd; "Incidents of Spanish Travel," Rev. T. J. Maynard; "The Earth—Past, Present and Future," Rev. G. R. Sumner; "The Life of the late Dr. Kitto," Rev. J. W. S. Powell; "On Russia," Rev. Canon Champneys; "Incidents of a Tour in the Crimea," Rev. Haldane Stewart; "Chaucer and his Times," the very Rev. Dean Trench; "On the Application of Science to Human Health and Well being," E.W. Lane, Esq., M.D.; "The Electric Telegraph," C. F. Varley, Esq.; "On Mineralogy," Rev. H. C. Eade; "A Day at Rome in 1857," Rev. A. R. C. Dallas; "A Night at the Cambridge Observatory," Rev. Canon Carus; "Cavern Researches," E. Vivian, Esq.; "Ballad Literature," Rev. W. L. Blackley; "India—Past and Present," Rev. T. G. Clarke; "The Manners and Customs of the Greeks," Rev. J.. E. Sabin; "George Stephenson, Miner and Engineer," Rev. T. G. Hatchard; "Characteristics—English, Scotch, and Irish," Rev. F. Trench; "Mahomet and his Religion, &c.," Rev. Canon Champneys; "Cowper and his Poems," Rev. J. W. S. Powell; "On China," Rev. Canon Champneys; "A Ship at Sea," Rev. Haldane Stewart; "Manners and Customs of the Chinese," Rev. T. G. H. Hough; "Insect Life," Rev. T. C. Clarke; "Ireland in 1858," Rev. A. R. C. Dallas; "Advertisements," Rev. W. L. Blackley; "Recollections of a Tour in Switzerland," Rev. E. D Wickham; "Farnham and its Borough," Rev. R. N. Milford; "The Ocean," Rev. Mark Cooper; "On Australia. Rev. J. Bacon; "The Days of the Week," Rev. Charles Kingsley; "The Romance of Chemistry," W. White, Esq.; "The Turks and their Customs," Rev. J. E. Sabin. All these lectures were delivered gratuitously, and in four instances only the lecturers' travelling expenses were paid. The lecture on "Farnham and its Borough" has been published, at the request of the committee. The number of lectures in each session is, as a rule, limited to twelve. The receipts and expenditure of the last three sessions have been as follows:—Fourth session, receipts £23 6s., expenditure £11 3s.; Fifth session, receipts £16 12s., expenditure £8 2s. 8d.; Sixth session, receipts £22 9s. 6d., expenditure £14 9s. The actual receipts at lectures are diminishing, in consequence of the rapid increase of the number of members and subscribers to the association, who are admitted free to the lectures. The plan of issuing lecture tickets for the labouring classes and domestic servants, for back seats at half price, has been attended with the happiest results, no less a number than 423 having availed themselves of this privilege in the three lecture sessions during which the scheme has been adopted. The six best scholars in each National School are admitted free. The chair has usually been taken at the delivery of the lectures by the President, and the attendance of members and friends has always been very large, the room on several occasions being much overcrowded. The committee hope ere long to be enabled to take some effectual steps to improve the ventilation of the lecture room. The committee have much pleasure in again announcing that the state of the funds is very encouraging, when taken in connection with the fact that the annual receipts show a steady advance in the number of ordinary members. The annual accounts for the last three years stand as follows;—1856, receipts £80 15s. 1d., expenditure £86 5s.; 1857, receipts £97 17s. 8d., expenditure £96 6s. 3d.; 1858, £89 18s. 10d., expenditure £92 3s. 3d. The receipts for 1859 already amount to £18 16s. 6d. In closing this report the committee, on behalf of themselves and the members of the association generally, offer their warmest thanks to their esteemed President, the Lord Bishop of Winchester, for his unfailing interest in the welfare of the association, to which they cannot but attribute a very large share of the success which has hitherto attended its operation; and for his kindness in taking the chair at so many of the lectures; and to the Vice-President, the Rev. J. S. Utterton, for his constant exertions on behalf of the association. They also beg to offer their best thanks to those numerous friends who have so kindly come, in many cases from a long distance, to deliver lectures before the members; and to the Treasurer, Secretary, and all the elected officers, for their unwearying assiduity in the discharge of their various duties. Since the publication of this report, which is dated September 1859, the association appears to have made considerable advances, as shown by the balance sheet for 1860.

MEETINGS FOR THE ENSUING WEEK.

MON. ...Royal Inst., 2. General Monthly Meeting.
Entomological, 8.
Brit. Architects, 8. Anniversary.
United Service Inst., 8½. Major Rhodes, "Submarine Telegraphy within the limits of the Arctic and North Atlantic Regions."

TUES. ...Royal Inst., 3. Mr. John Hullah, "On the History of Modern Music."
Civil Engineers, 8. Continued Discussion upon "The National Defences."
Pathological, 8.
Photographic, 8.

WED. ...Literary Fund, 3.
Society of Arts, 8. Mr. P. L. Simmonds, "On the Trade and Commerce of the Eastern Archipelago."
Geological, 8 (Burlington House) 1. M. Alfred Fontan, "Description of Two Bone-Caves in the Mountain of Ker, at Massat, Department of the Ariege" 2. Mr. Joseph Prestwich. "Notes on some Further Discoveries of Flint Implements in the Drift; with some suggestions for further research."
Graphic, 8.
Microscopical, 8.
Royal Soc. Literature, 8.
Archæological Assoc., 8½.

THURS...Royal Inst., 3. Mr. Pengelly, "On the Devonian Age of the World."
Philological, 8.
Artists and Amateurs, 8.
Antiquaries, 8½.

FRI. .....United Service Inst., 3. Colonel Shafto Adair, "England, her Wars and Expeditions since 1815."
Astronomical, 8.
Royal Inst., 8. Mr. W. S. Savory, "On the Relation of the Animal and Vegetable to the Inorganic Kingdom."

SAT. .....Asiatic, 3. Anniversary.
Royal Inst., 3. Prof. Max Muller, "On the Science of Language."
Royal Botanic, 3½.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. Num.

Delivered on 19th April, 1861.

60. Local Acts (61. North Somerset Railway; 62. Bambridge Extension Railway; 63. Sittingbourne and Sheerness Railway; 64. Rhyl Harbour, Bridge, and Railway)—Admiralty Reports.
102. Brewers, &c.—Accounts.
171. New South Wales (Military Expenditure)—Return.
172. Railway and Canal Bills—Fourth Report from Committee.
131 (1). Civil Service Estimates—Class 1.
102. Bills—Industrial Schools—(Amended),
104. ,, Copyright (Works of Art).
105. ,, Borough of Dublin—(Amended by the Select Committee).
108. ,, Queensland Government.
Lights, Buoys, and Beacons—Report of Commissioners, Vols. 1 and 2.

Delivered on 20th and 22nd April, 1861.

72 (1). East India (Indigo Commission)—Papers, Part 2.
74. Joint Stock Companies—Return.
103. Public Offices—Return.
130. Revenue Departments—Estimates.
136. War Office (Temporary Clerks)—Return (a corrected Copy).
161. Chelsea, Kensington, and Birkenhead)—Returns.
170. Apprentices (Merchant Service)—Return.

Delivered on 23rd April, 1861.

143. Savings Banks (Number of Depositors, &c.)—Accounts.
143 (1). Savings Banks (Sums Paid or Withdrawn, &c.)—Return.
158. Battersea Burial Ground—Return.
169. War Office (Account Branch)—Return.
72 (2). East India (Indigo Commission).
107. Bills—Railway Companies Mortgage Transfer (Scotland).
109. ,, Reformatory Schools (Scotland).
111. ,, Courts of Justice Building.

Delivered on 24th April, 1861.

3 (1). Corporal Punishment—Supplemental Return.
72 (3). East India (Indigo Commission)—Supplemental Papers.
165. Reformatory Schools (Dublin)—Return.
179. Alderney Harbour—Return.
183. Military Prisons—Return.
173. Business of the House—Report from the Committee.

Delivered on 25th April, 1861.

178. Metropolitan Board of Works—Return.
182. Enfield Factory—Return.
185. Ionian Islands—Papers and Correspondence.
188. Committee of Selection—Sixth Report.
112. Bill—Dwellings for Working Classes.
Italy—Further Correspondence. Part 9.

Delivered on 26th April, 1861.

163. National Debt—Return.
181. Woods, Forests, and Land Revenues—Abstract Accounts.
189 Railway and Canal Bills—Fifth Report from Committee.
192. Treasury Chest—Account.
196. Revenue (1850)—Particulars of Memorials.
113. Bills—Combination of Parishes Dissolution (Scotland).
114. Bills—Law of Foreign Countries—Lords' Amendments.

Delivered on 27th and 29th April, 1861.

60. Local Acts (65. Llanelly Railway and Dock Company (New Lines, &c.)—66. Wexford Harbour Commissioners—67. New Ross Port and Harbour—68. Aberystwith and Welsh Coast Railways)—Admiralty Reports.
120. Increase and Diminution (Public Offices)—Abstract of Accounts.
184. Cork Union Workhouse—Abstract Return.
190. Electors, &c. (West Riding of Yorkshire)—Return.
193. Foreign Wine—Abstract.
195. Chamber of London—Annual Accounts.
38 (3). Trade and Navigation Accounts (31st March, 1861).
132. Post Office Packet Service—Estimate.
194. Thames Conservancy—Paper.
176. Cambridge University—Papers.
177. Oxford University—Papers.
115. Bills—Offence against the Person (Amended by the Select Committee).
116. ,, Edinburgh Assessments.

SESSION 1860.

570. Sessional Printed Papers—Numerical List and Index.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED

[*From Gazette, April 26th*, 1861.]

Dated 17th December, 1860.

3091. **A. S. Stocker, Wolverhampton—Imp. in the manufacture of tyre for wheels.**

Dated 6th February, 1861.

306. **T. Gee, Nottingham—The production of a new composition or compositions, of which refuse leather is the chief ingredient, and manufacturing therefrom articles of utility, plain or ornamented.**

Dated 14th March, 1861.

640 **A. F. Ménard, 10, Rue de Strasbourg, Paris—Imp. in tanning and the apparatus employed therein. (A com.)**

Dated 15th March, 1861.

658. **H. A. Ward, Birmingham—Imp. in apparatus for transmitting signals on railway trains.**

Dated 25th March, 1861.

718. **J. Morgan and A. T. Jay, 132, Upper Thames-street, E. Edwards, 13, Beaufort-buildings, Strand, and J. Tilston, 2, Lower Gore, Kensington—Imp. in ropes or cables for submarine or other electric telegraphs, and for the rigging of ships and other purposes.**

Dated 1st April, 1861.

798. **G. Edwondson, Queenwood, Southampton—Imp. in washing machines.**

Dated 2nd April, 1861.

813. **A. Huray and H. Lollé, 42, Lafitte-street, Paris—A new optical apparatus for reproducing and varying all sorts of drawings, which apparatus they call goniometroscope.**

Dated 4th April, 1861.

828. **J. W. Lee, Crich, Derbyshire—Imp. in apparatus used in winding up watches, clocks, timepieces, musical boxes, or telltales, or for other purposes to which the same may be applicable.**

Dated 5th April, 1861.

838. **W. Richardson, 24, New Walk, Leicester—Imp. in carriage and other axles, and also in shafts and other parts of machinery exposed to the action of the atmosphere.**
844. **G. Hawksley, Three Mill-lane, Bromley-by-Bow, Middlesex—Imp. in apparatus for measuring water and other liquids.**

Dated 8th April, 1861.

866. **J. Walker and J. Barnes, Oakenshaw, Lancashire—An imp. in the manufacture of "card cloth," used for carding cotton, wool, and other fibrous substances.**
862. **H. W. Blake, Soho, Birmingham—Imp. in coining machinery and in apparatus employed for regulating the expansion of elastic fluids.**

Dated 10th April, 1861.

879. **J. Ivers and J. Pollitt, Preston—A certain imp. in machinery or apparatus employed in preparing cotton, wool, flax, and other fibrous substances for spinning.**
881. **W. B. Peck, Broad-street, Bristol—Imp. in screw propellers.**
883. **G. Gardiner, New York City, U.S.—A new improved spring.**
885. **W. R. Rogers, Gray's-inn-road—Imp. in dowels.**

Dated 11th April, 1861.

887. **D. Chalmers, Glasgow—Imp. in weaving textile fabrics.**
888. **W. Mc Connel, Manchester—Imp. in engines for carding cotton and other fibrous materials.**
889. **J. Shand and S. Mason, 245, Blackfriars-road—Imp. in steam fire engines and pumps.**
890. **W. Bury, Portman-street, Marylebone—Imp. in steam engines, and in boilers for the same.**
891. **J. Lancelott, 2, Brownlow-road, Dalston—Imp. in machinery for the manufacture of sheet metal chains**
893. **C. Stevens, 31, Charing-cross—An improved apparatus for raising liquids, especially beer and wine from casks. (A com.)**
895. **R. A. Brooman, 166, Fleet-street—Imp. in sizing or preparing paper and textile fabrics in order to render them waterproof, and to increase the strength thereof. (A com.)**
896. **R. Smith, Shaw-house, Melksham, Wiltshire—Imp. in roller blind apparatus.**
897. **W. E. Newton, 66, Chancery-lane—Imp. in pressure gauges. (A com.)**
898. **S. Roberts, Hull—Imp. in steam-engines, and in generators to be used therewith.**
899. **J. M. Dunlop, Manchester—Imp. in machinery for cleansing cotton.**

Dated 12th April, 1861.

901. **G. C. Haseler, 19, Victoria-street, Birmingham—Imp. in the joints or hinges of lockets.**
902. **T. Carr, Chowbent, Lancashire—Imp. in machinery or apparatus for forging and shaping articles of iron or other metal or material.**
903. **J. Ward, Blackburn, and R. Greenwood, Whittle-le-Woods, Lancashire—Imp. in machinery or apparatus for preparing fibrous materials to be spun.**

Dated 13th April, 1861.

905. J. E. A. Gwynne, Essex-street Wharves, Strand—Imp. in machines for breaking, crushing, and reducing stones and other substances.
907. T. Bailey, Aston-road, Birmingham—Imp. in breech-loading fire-arms.
908. J. R. Cooper, Birmingham—An imp. in, or addition to, certain kinds of breech loading fire-arms and ordnance.
909. J. Silvester, West Bromwich, Staffordshire—Imp. in spring balances or weighing machines, and in dynamometers.
911. G. Graham, Dumbarton, N.B.—Imp. relating to ornamental cotton fabrics having Turkey-red grounds.
913. E. Corke, South Borough, Tonbridge Wells, Kent—An improved instrument to be fixed on the bayonet or muzzle of a rifle for estimating distances.
914. C. Roberts, Douglas, Isle of Man—Imp. in boots and shoes, and other similar coverings for the feet.
915. C. D. Abel, 20, Southampton-buildings, Chancery-lane—Imp. in the construction of turntables. (A com.)
916. W. T. Eley, Gray's-inn-road—Imp. in the manufacture of cartridge cases for breech-loading fire-arms.
917. C. D. Abel, 20, Southampton-buildings, Chancery-lane—Imp. in machinery for forging nails. (A com.)

Dated 15th April, 1861.

919. A. Bradbury, Oldham, Lancashire—Imp. in machinery for spinning and doubling cotton, and other fibrous materials.
921. E. Brooks, Birmingham—New or improved machinery for grinding and polishing swords, matchetts, and knives, which said machinery may also be employed for grinding gun barrels and files, and for other like purposes.
923. A. Sax, Paris—Imp. in ordance and projectiles.
924. T. Miller, Fossaway, Perth, N.B.—Imp. in the method of, and machinery for, preparing india-rubber and other similar gums for insulating telegraphic wires, and in machinery for laying or applying strips of india-rubber and other similar gums, or strips of fibrous or textile material on to telegraphic wires.
925. R. C. Furley, Edinburgh—Rendering pills tasteless by means of a coating of albumen.
926. F. Lennard, Belgrave-gate, Leicester—Imp. in the manufacture of looped pile fabrics.
927. F. Gye, Wandsworth-road, Surrey—Imp. in obtaining light, and in the apparatus employed therein.

Dated 16th April, 1861.

928. S. Ridge, Hoviley-bridge, near Hyde—Imp. in apparatus applicable to steam boilers and steam engines.
929. F. M. Eden, 5, Hare-court, Temple—An improved method of manufacturing silicate of lime or hydraulic cement.
930. F. M. Eden, 5, Hare-court, Temple—An improved cartridge for breech-loading guns.
931. P. Gipouloux, 29, Rue Thevenot, Paris—An improved cooking stove.
932. J. D. Malcolm, Brixton, Surrey—Imp. in the manufacture of nitric acid and caustic soda, which are also applicable to the obtaining of other chemical products.
933. R. Ransome, Ipswich—Imp. in inkstands.
934. C. Fletcher, Nottingham—Improved machinery or apparatus for the manufacture of chenile.
935. R. Hodgson and Enoch Holden, Carlisle—Imp. in the manufacture of soap.
936. D. Chalmers, Glasgow—Imp. in looms for weaving.

Dated 17th April, 1861.

937. W. Jenkins, Montpelier-street, Brompton—Imp. in medicated belts or bands for the alleviation of pain in or prevention of cholera, and for the prevention or cure of pulmonary or other complaints.
941. J. Vickermann, Taylor-hill, near Huddersfield — Imp. in syphons, for carrying off the condensed water from steam-pipes.
942. G. Leroy, Bristol—Improved construction of vessel for containing aerated liquids.
945. W. Clark, 53, Chancery-lane—Improved arrangement of atmospheric post for the transmission of letters, papers and other despatches, and articles in tubes. (A com.)

INVENTION WITH COMPLETE SPECIFICATION FILED.

971. J. P. Schenkl, Boston, U.S.—A new and useful packing for projectiles for guns or ordnance, especially those which are rifled or grooved on their bores.—19th April, 1861.

PATENTS SEALED.

[*From Gazette, April 26th*, 1861.]

April 26th.

2640. T. Neal.
2642. E. Harrison, W. Bradbury, J. Buckley, & D. Garside.
2646. A. S. Stocker.
2652 J. Beck.
2657. J. M. Henderson.
2660. W. Bull.
2662. L. Martin and O. Penfold.
2666. J. Anderson.
2671. E. F. Prentiss.
2672. J. Underhill.
2681. H. Williamson.
2688. W. T. Denham.
2694. J. Armour.
2703. J. Mitchell.
2711. J. Webster.
2731. T. Cobley.
2734. P. W. Rennel.
2763. W. Spence.
2788. R. W. Waithman and J. Waithman.
2798. J. Schofield & M. Schofield.
2812. J. C. M. Béziat.
2858. S. A. Varley and C. F. Varley.
156. W. Chark.
184. J. Deakin and C. Cresswell.
410. A. V. Newton.

[*From Gazette, April 30th*, 1861.]

April 30th.

2673. W. Edwards.
2685. G. Hamilton.
2687. R. A. Brooman.
2693. W. Durham.
2697. G. Shillibeer and G. Giles.
2698. R. B. Pilliner.
2699. T. Wrigley.
2702. P. Spence.
2707. E. F. Prentiss.
2708. E. F. Prentiss.
2709. J. Lancaster.
2714. W. Green.
2716. J. Froggatt, jun.
2718. T. W. Rammell.
2724. C. Neumann.
2726. E. Howe, jun.
2732. E. Salisbury.
2741. S. Fox.
2786. W. Clark.
2792. J. S. Crosland.
2803. G. Bagshaw.
2818. R. Bodmer.
2829. B. Blackburn and H. Carr.
2862. R. Jobson.
2929. H. Gilbee.
3078. W. E. Newton.
196 W. Longmaid.
364. C. F. Atkinson.
560. R. Brearley, jun.
595. W. H. Buckland.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, April 26th*, 1861.]

April 22nd.

903. C. Lungley.

April 24th.

914. J. M. Fisher.

[*From Gazette, April 30th*, 1861.]

April 25th.

915. J. Braidwood.

April 26th.

936. W. Keilier.
978. L. Talabot.
987. W. Clark.
998. T. Preston.
999. W. S. Hollands.

April 27th.

925. E. Hunt and H. D. Pochin.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[*From Gazette, April 26th*, 1861.]

April 23rd.

1104. J. Horsfall.

[*From Gazette, April 30th*, 1861.]

April 26th.

960. J. Barling.

LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
4350	March 30.	The Fluted Legging Spring	Thomas Davenport	185, Rockingham-street, Sheffield.
4351	,, 30.	The Mechian Travelling Bag	Mechi and Bazin	Regent-street, W.
4352	Apr. 3.	A Capping Ring	Peter B. Cow	Cheapside, E.C.
4353	,, 5.	Improved Round Drift	John Eglin	Amrolee, near Surat, East India.
4354	,, 9.	Screw Wrench	John Palmer and Sons	Beech-lanes, near Birmingham.
4355	,, 11.	Draught Box and Draught Plate for Grates	Henry Crichley	Birmingham.
4356	,, 17.	Railway Hand Flag and Fog Signal Case	Cuthbert Harrison Thew	Whitehaven.
4357	,, 17.	The Elcho Neck Tie	Thomas Harris Toms	Stalning lane, City, E.C.
4358	,, 17.	Cottage Washing Machine	John Gibson	Malton, Yorkshire.
4359	,, 18.	Holder or Binder for Music and other Paper	Edwin Orchard	Balsale-heath, near Birmingham.
4360	,, 19.	Thread Sample Book	Kerr and Clark	Linside Thread Works, Paisley, N.B.
4361	,, 24.	Landau Body	Cook and Holdway	12, Mount-street, Grosvenor-square, W.
4362	,, 26.	Combined Gun and Cartridge Case	George Gibson Bussey	Davis's-passage, New Oxford-st. W.C.
4363	,, 26.	The Improved Atmospherical Hat	Wm. Gillett	Market-place, Hull.
4364	,, 29.	Anslow's Ready Threaded Needle and Cotton Box	Charlotte Sarah Anslow	68, Darlington-street, Wolverhampton.